Space Weather Forecast

Issued on Wednesday, 06 December 2023 at 12:55 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of further isolated Moderate-class flares (R1-R2 Blackouts) throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity is currently Moderate with two Moderate-Class flares in the past 24 hours, both of which originated from a region in the northeast. There are currently 9 sunspot regions on the visible disc. The most active region on the disc is the region in the northeast. The viewing angle of this region is improving, showing some magnetic complexity. Two other larger regions on the disc are close to centre disc in the south. There is a complex of regions in this area, with magnetic connection between these regions. A region near north centre disc has developed some magnetic complexity. The other regions on the disc appear mostly smaller and simpler at present, although another new region in the northeast is still difficult to see near the limb and is starting to show greater area.

A number of Coronal Mass Ejections (CMEs) have been evident in coronagraph imagery during the past 24 hours. An eruption from the north centre disc starting around 06/0430 UTC may produce a CME, although nothing has yet appeared in coronagraph imagery. An earlier eruption around 05/2130 UTC seems to be mostly northward directed and is less likely to reach Earth.

Solar Wind / Geomagnetic Activity: Solar wind measurements show an ongoing coronal hole fast wind. Wind speeds have been at elevated to strong levels, mostly just above 600 km/s. The Interplanetary Magnetic Field (IMF) has been weak throughout, with the north-south component varying weakly. Geomagnetic activity was Quiet to Unsettled (Kp 2-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) persisted at background levels with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be Low to Moderate with a chance of further Moderate-class flares, mainly from the region in the northeast, but perhaps also from the regions near centre disc.

Solar Winds / Geomagnetic Activity: The CME produced by an eruption around 04/0700 UTC is expected to miss Earth, however, there is a very slight chance of a glancing blow late Day 1 (06 Dec) or early Day 2 (07 Dec). A CME visible on recent coronagraph imagery towards the northwest is now considered likely to miss Earth. A further eruption near north centre disc was observed starting around 06/0430 UTC, but so far nothing has appeared in coronagraph imagery. Solar winds are currently at strong levels (around 600 km/s) due to the ongoing coronal hole fast wind. Solar winds are expected to gradually decline through the coming days, with speeds likely to be near background levels by Day 4 (09 Dec).

Geomagnetic activity is expected to be largely Quiet to Unsettled (Kp 0-3). There is a very slight chance late Day 1 or early Day 2 that a glancing blow from a CME may produce an Active (Kp 4) or G1/Minor Geomagnetic Storm interval (Kp 5) but this is considered a low probability.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to remain at background levels, with just a slight chance of reaching the S1/Minor Storm level should there be any larger flares from the regions near centre disc, or in the short term from the active region which is now just over the west limb.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	5	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	50	50	50	50
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	7	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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